Shades of early WW II radar antennas. K3WBH brings us another multipurpose antenna that's just as much fun to build as to use.

The Poor Man's Radar

A Signal Seeking And Satellite Tracking Antenna For 432 MHz

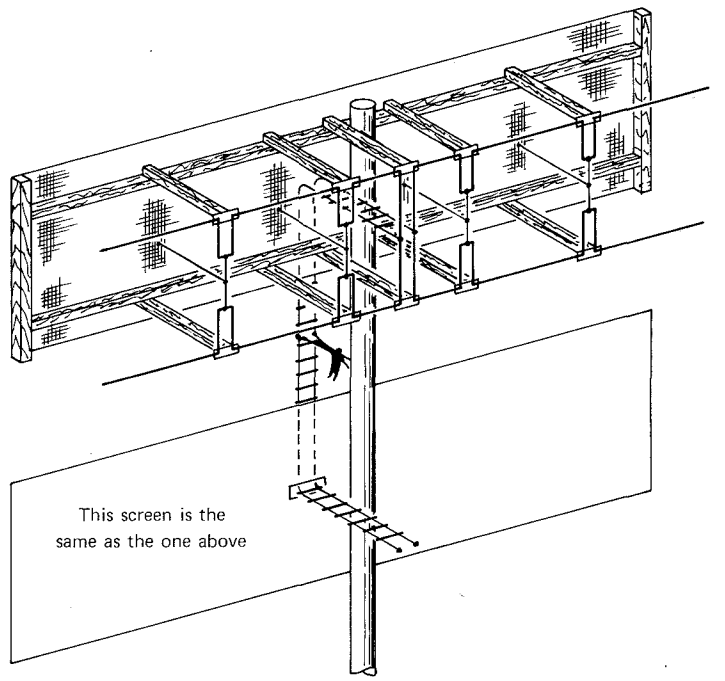

Fig. 1– Overall view of the poor man's radar antenna.

BY T.E. WHITE*, K3WBH

The u.h.f. amateur who wishes to have a multipurpose antenna that will serve equally well for earthly QSOs, space object tracking, storm warning, and OSCAR repeating may be interested in The Poor Man's Radar.

Parabolics are fine if you work for a government agency or government contractor and can beg, borrow, or steal one. However, home construction of one is somewhat difficult for just plain Sam the Ham. A plane reflector backing up a billboard of dipoles is easier, but their feed harnesses may waste more power than they deliver.

A simpler and more efficient solution is to obtain uniform current flow by judicious use of stubs which are physically integral parts of the elements themselves. This system is "self-grounding," providing built-in static drain and lightning protection. Used commercially for years on h.f. bands, there is no reason why it cannot serve well at u.h.f.

The compact array shown in fig. 1, with its provision for changing elevation as well as azimuth as in fig. 6, is worth considering. Construction is straightforward and feeding is "low loss." The capture area of the double curtain is around 470 square feet which translates into about 9 square λ. This measure is more important than any sheer gain figure as, at u.h.f., what counts most is presenting the maximum possible pickup or intercepting "surface" to an advancing wave front.

I wish more antenna manufacturers (and book and magazine editors) would remember ye olde wavelength factor. If a dipole at 6 meters delivers 1 uv of a given signal to a receiver antenna terminal, it takes 9 dipoles at ¾ meter to deliver an equivalent voltage.

This antenna also makes an excellent summer storm-warning "radar." Hook it up to your TV set, select channel 2 (yes, 2), turn it on, wait 30 seconds, turn down the brightness until the picture just goes black, switch to 13, and watch for "spikes." Rotate the antenna for maximum "flash" and you have direction of approaching thunderstorm.

Although "pulsed" transmissions are supposedly illegal by amateurs on ¾ meter, you can, if you can develop a fair amount of power, say 100 watts, key a c.w. character or two with the antenna pointed toward an approaching front or squall line, switch to receive, and watch for a return on a panadaptor hooked to your "hearing aid." Don't laugh . . . it's entirely possible. You don't need a 50 kw magnetron.

Another experiment would be to try some diversity reception on RTTY, siting two of these curtain sets 25λ apart

*36 Lake Ave., Fair Haven, N.J. 07701

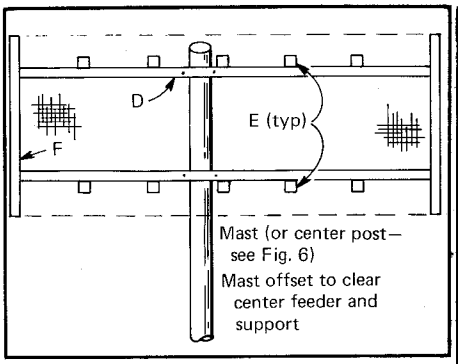

Fig. 2- Assembly of the screen frame and element outriggers (2 required).

(± 60 feet). Or, study Doppler effects from a satellite. Or, orient one beam vertically and another horizontally with switching provisions.

Construction

Two reflectors, of 30-inch wide chicken wire with 1-inch mesh, each 78 inches long, are made up on a wood frame (fig. 2). Two insulated "windows" are provided to pass the feeder branches through the screens. Spacing of elements to screens is 5-5/8 inches. Spacing between screens is 12 inches.

The dipoles and stubs are of 1/8-inch s.h.d. rod, preformed in groups, each containing one ¼- and two ½-wave elements, and two ¼-wave stubs (fig. 4).

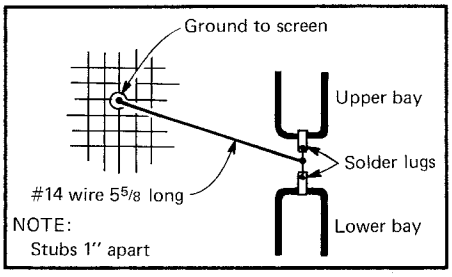

Fig. 5- Stub grounding system.

Key	Part	Lgth. (ins.)	# Req.	Mat'l
A	¼λ sec.	6½	8	⅛" alum. rod
B	stub	7	"	"
C	½λ sec.	13	"	"
D	longeron	76½	4	1 × 1 spruce
E	outrigger	6	20	"
F	end piece	30	4	"

Table I- Physical dimensions for keyed letter designations.

The center of each upper stub is shorted to its mate below by wrapping a solder lug around the rod and running a common wire to the screen, where a nut, bolt, and washer make connection (the galvanizing must be scraped off the screen). (See fig. 5.) All connections are "doped" with a suitable protective spray.

Fig. 6 shows a means of adjusting

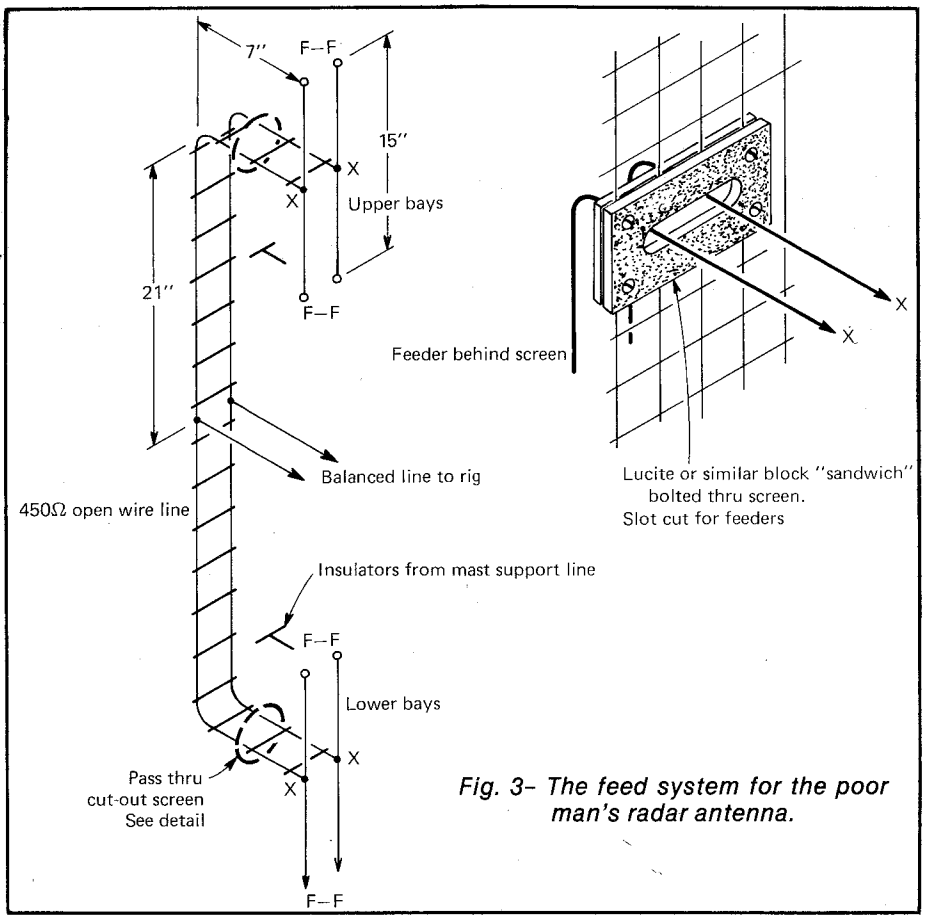

Fig. 3- The feed system for the poor man's radar antenna.

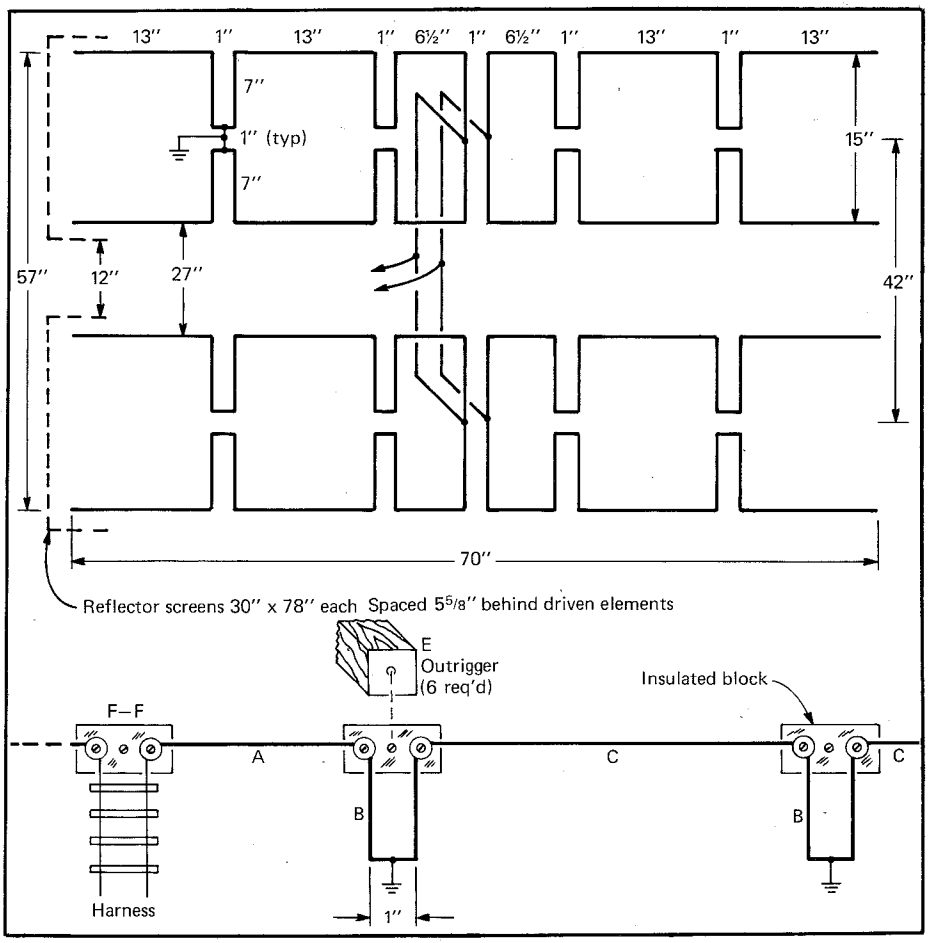

Fig. 4- The basic electrical schematic of the antenna. (B) The typical dipole and stub section (8 required).

elevation, if desired. A center post replaces the mast and a shoe and brackets assembly is built up to attach the post to the main mast. While it is necessary to climb the mast or lower the array to change elevation, this is far cheaper than a motor-driven elevating screw system.

Testing

The best way to test this array for gain and pattern data is to temporarily mount it in a clear, flat area, with no less than 10 feet from bottom of lower screen to ground. No metallic objects should be within 20 feet of the array.

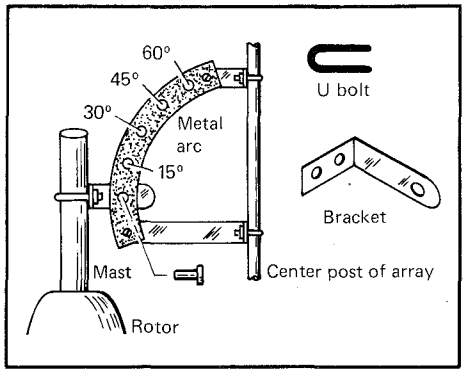

Fig. 6– Optional method for changing elevation.

Mount a target dipole or corner reflector at the same height as the middle of the array at least 60 feet away. Connect a calibrated field strength meter tuned to 428 MHz. Turn on your transmitter and generate a c.w. or f.m. signal. Take readings every 2 MHz up to 438 MHz. Plot a gain versus frequency chart.

Then rotate the array in 15 degree segments off target each side up to 60 degrees, and repeat readings to obtain a horizontal "nose" pattern. If you will be using a variable elevation mount, you can check the H-plane (vertical) pattern by taking readings at each 15 degree step.

More Useable Antenna for your Money

Only Butternut's HF5V-III with Differential Reactance Tuning leaves the entire antenna active on 10, 20, 40, and 80 meters! On 15 a loss-free linear decoupler provides a full unloaded quarter-wave conductor (with the ad-added advantage of decreased wind loading and lower center of gravity).

★ Compare active element lengths "Band for Band", for the HF5V-III and *any* multi-trap design of similar height; when it comes to SWR bandwidth, efficiency, and overall performance, there's really no comparison! And if your rig covers 160 meters, what other antenna offers six-band capability?*

★ No lossy traps or unsightly, wind-catching "top hats".

★ Useable on adjacent MARS frequencies with little or no adjustment.

★ Longer elements mean greater bandwidth and significantly higher efficiency for superior low-angle DX performance.

★ Heavy duty air-wound inductors permit correct resonance on 80 and 40 meters and can be adjusted for lowest SWR on these bands.

★ Easiest five-band vertical to assemble and adjust.

★ Sleek, trim design makes the HF5V-III "XYL approved" and requires no guying.

*With optional TBR-160

Engineering quality for the serious Amateur

B C E

BUTTERNUT ELECTRONICS CO.

P.O. BOX 1411 SAN MARCOS, TX 78666
Phone: (512) 396-4111

Pat. applied for

Request free catalogue today.

S-LINE OWNERS
ENHANCE YOUR INVESTMENT
with
TUBESTERS™
Plug-in, solid state tube replacements
• S-line performance—solid state!
• Heat dissipation reduced 60%
• Goodbye hard-to-find tubes
• Unlimited equipment life

TUBESTERS cost less than two tubes, and are guaranteed for so long as you own your S-line.

SKYTEC
Box 535
Talmage, CA 95481

Write or phone for specs and prices.
(707) 462-6882

CIRCLE 9 ON READER SERVICE CARD

TUBES, SEMICONDUCTORS, IC's DIODES AT SUPER LOW PRICES IN DEPTH INVENTORY EIMAC, SYLVANIA, GE, CETRON

3-500Z	93.50
4X150A	49.00
4CX250B	40.00
6JS6C	4.28
6L6GC	3.54
6LF6	4.61
6LQ6	4.82
6KD6	4.86
572B/T160L	37.00
5894A	42.00
6146B	5.85
6360	6.50
7360	9.95
811A	12.00
8950	7.65
MRF 454	19.95
2N6084	12.95

Full Line of Sylvania ECG Replacements, Semiconductors, Always In Stock. All Major Manufacturers Factory Boxed, Hard To Get Receiving Tubes At Discount Prices.

Minimum Order $25.00. Allow $3.00 For UPS Charges. Just Call! Toll Free Number: 800-221-5802-3 Out Of Town. Phone Number (212) 633-2800 City. TWX 710-584-2460 ALPHA NYK.

Transleteronic, Inc.
1365 39th STREET BROOKLYN, N.Y. 11218
Tel. 212-633-2800

CIRCLE 15 ON READER SERVICE COUPON

Please send all reader inquiries directly